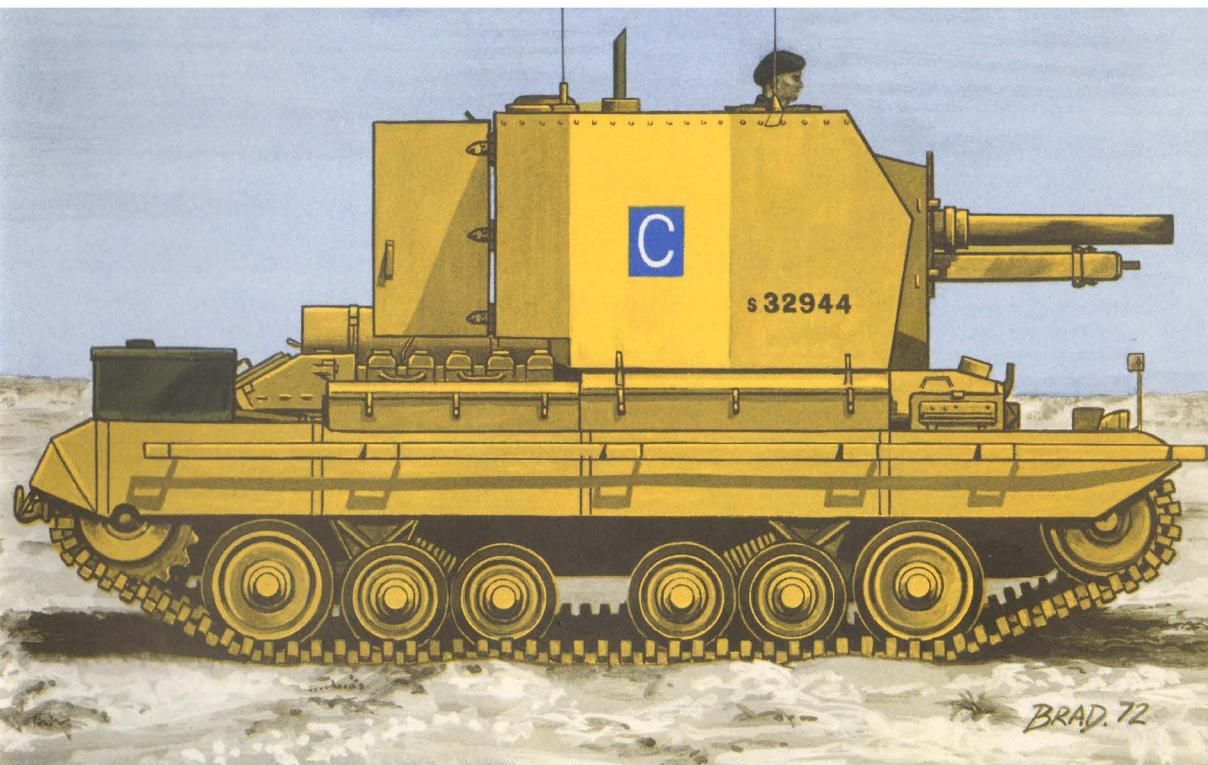




SERIES
31

MILITARY VEHICLE PRINTS



SERIES THIRTY ONE

CARRIER, VALENTINE, 25 pdr GUN MARK I 'BISHOP'

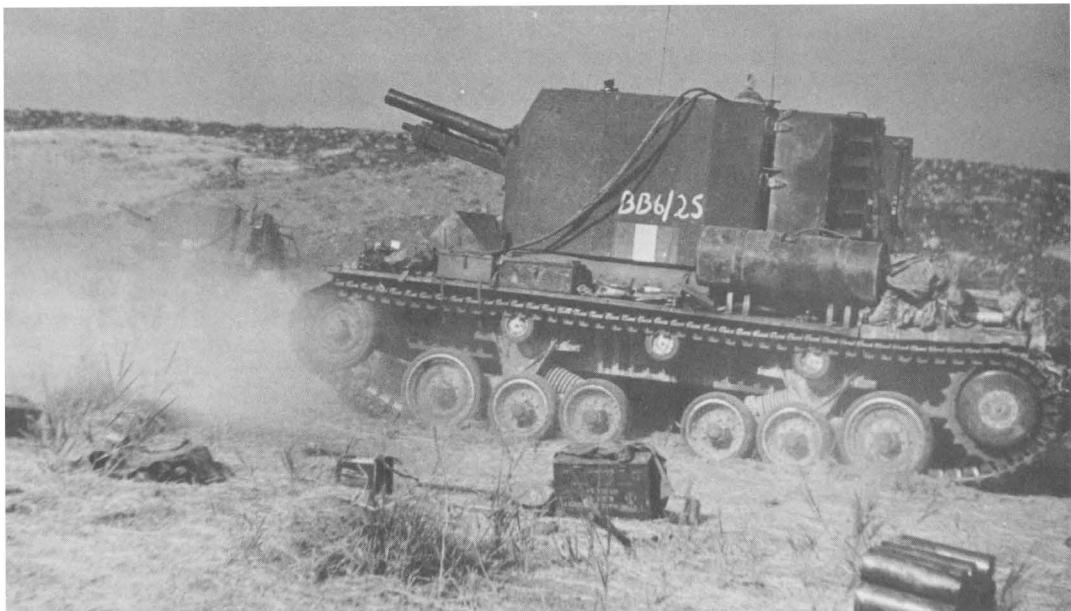
(UK)

NUMBER 27 ARTILLERY TRAILER

(UK)

CHRISTIE TANK – MODEL 1919

(US)



ABOVE: Bishop self-propelled 25 pdr gun battery in action in Sicily in July 1943. In the background is another vehicle of the same Royal Artillery Regiment. The latter vehicle had the number BB 6/27 and had the name EDNA II painted on it by the crew. These guns were attached to the units of the 6th Armoured Division and assisted in the attack on the ETNA line. (IMPERIAL WAR MUSEUM PHOTOGRAPH – BNA 5083).

COVER ILLUSTRATION – Drawn by George Bradford

A Bishop self-propelled 25 pdr gun of the 121st Field Regiment Royal Artillery in Libya 1942. The "C" in the blue square and the unit badge are repeated on the front and rear hull plates. The S before the vehicle number signifies self-propelled. Some vehicles of this unit had a charcoal grey irregular band across the centre of the superstructure in an effort to break up the high silhouette.

BELLONA MILITARY VEHICLE PRINTS – Series Editor : Hilary Louis Doyle

CARRIER, VALENTINE, 25 pdr Gun Mk. I BISHOP

Drawings and Historical Research by D. P. Dyer.

BELLONA PRINTS which should be studied in conjunction with this series:

Series 8 – Self propelled 17 pdr "Archer". Series 3 – 105 mm H.M.C. M7B1.

With the entry of the Deutsche Afrika Korps into North Africa early in 1941 and the subsequent defeat of the British and Commonwealth troops in Cyrenaica, following the Blitzkrieg in Europe the year before, the Germans were credited with having vast numbers of 'superior' tanks as a reason for their successes. As history has shown it was neither quantity or the tanks themselves that enabled these successes to be obtained but the co-ordination in the use of Tanks, Artillery, Infantry and Supporting arms – namely superior tactics.

As British and Commonwealth troops were unable for some time to stem the German advances, and were armed with the 2 pdr tank and anti-tank guns which had been designed to fight tanks, this gun became the scapegoat for the defeats, whereas it should only be apportioned part of the blame.

Early in the morning of 14th April 1941, Rommel put in his first attack on Tobruk and for the first time was outmanoeuvred. The 38 tanks of 5th Panzer Regiment which were to spearhead the attack were allowed through the perimeter defences, which then held back his supporting Infantry and Artillery. When well inside the defences these tanks were fired upon by eight 25 pdr guns using high explosive shells at close range (there being no armour piercing shells available) and five were destroyed. In trying to evade the 25 pdr fire they encountered 2 pdrs who destroyed another four, and in fighting their way out of the defences lost a further eight to British Cruiser tanks and more 2 pdr anti-tank guns. This incident has been mentioned as it illustrates the point that German Tanks of the period were just as vulnerable to even high explosive fire from field guns as they were to orthodox anti-tank guns. No one appeared to be more surprised than the British gunners.

Whilst not an ideal solution to the problem of stopping enemy armour, from then on the 25 pdr was used fairly regularly as an anti-tank gun, until 2nd July, 1942 when the last 25 pdr gun versus tank battle was recorded. The 6 pdr anti-tank gun by then was more than successful in this role. Rommel didn't make the same mistake twice of allowing his tanks to be parted from their supporting troops (which is more than can be said of the British), and whenever 25 pdrs were used as Batteries in the anti-tank gun role they were shot at with everything the Germans could bring to bear, resulting in very high casualties amongst the gunners.

In order to utilise the anti-tank capabilities of the 25 pdr but at the same time give the gun crews protection, a request was initiated for a fully armoured mounting for this gun. It has been stated by various authors that it was the successful use by the Germans of Self-Propelled Field Artillery in the Western desert that lead to the development of similar weapons by the Allies, but this is a misconception. Prior to 1942 the only Artillery Gun the Germans had converted to a Self-Propelled mounting was the 15 cm. sIG L/12 which they fitted on Pz Kpfw I Ausf. B chassis. Only 38 of these had been used during the invasion of France in 1940 and it seems from contemporary Allied reports that it is doubtful if the Allies were even aware of the existence of such weapons at this period.

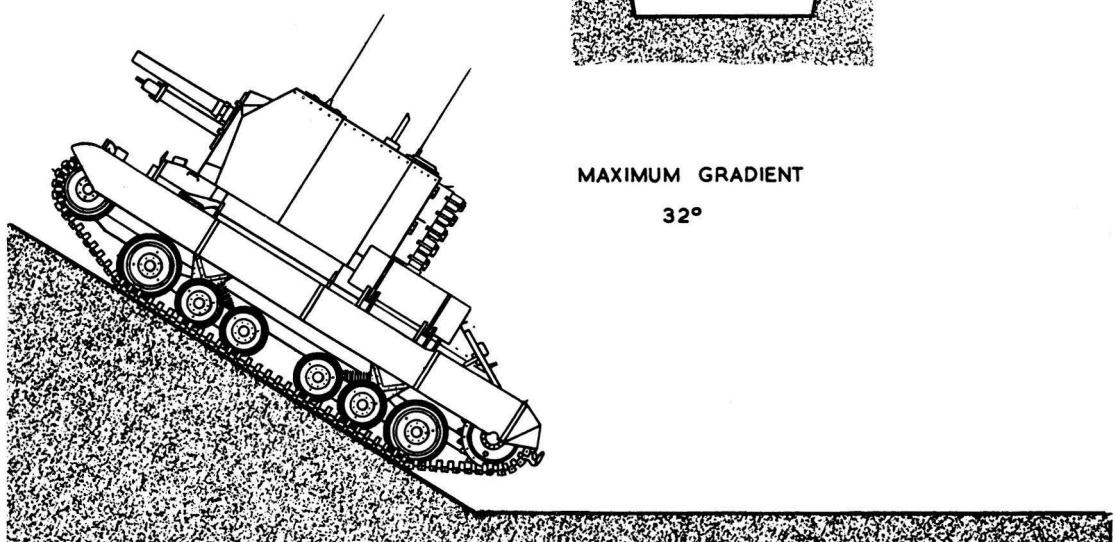
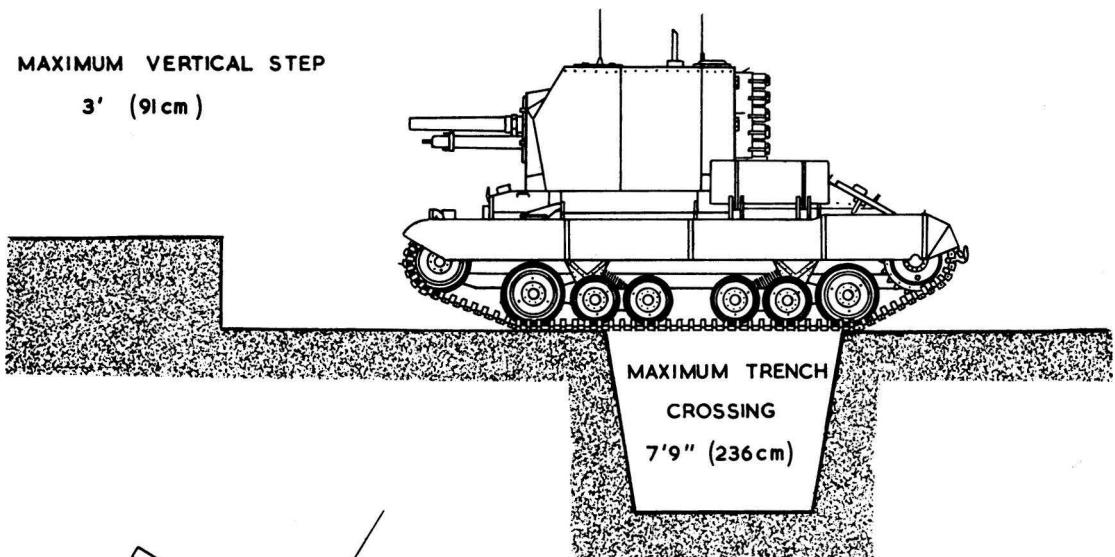
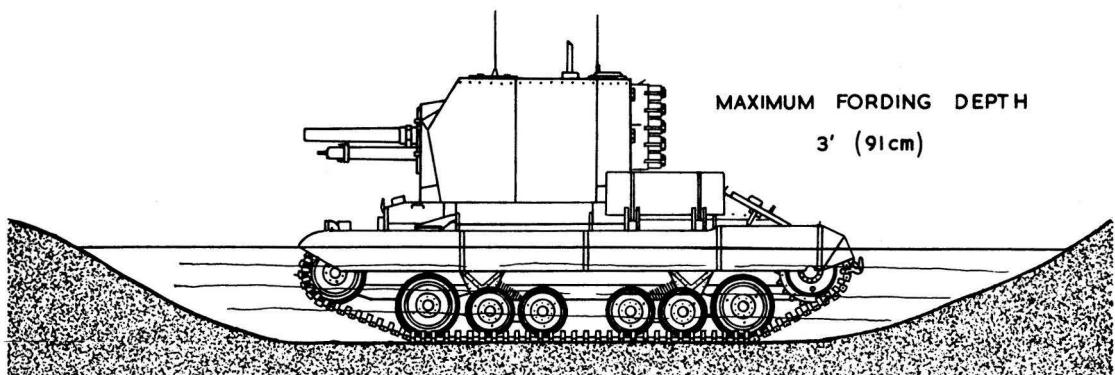
Since the First World War experiments had been conducted by both Britain and America in mounting guns on both wheeled and tracked chassis to improve mobility, cross country capability, or protection. The fluidity of the desert fighting highlighted this requirement, that had already been foreseen by a few, but had not been developed. It is of interest to note that at the same time as the British requested a Self-Propelled version of the 25 pdr the United States commenced design studies for mounting their 155 mm Field Howitzer on the chassis of their latest medium tank the M.3. This U.S. project eventually evolved as the highly successful 105 mm Howitzer Motor Carriage M7 and M7B1 (Bellona Prints Series 3).

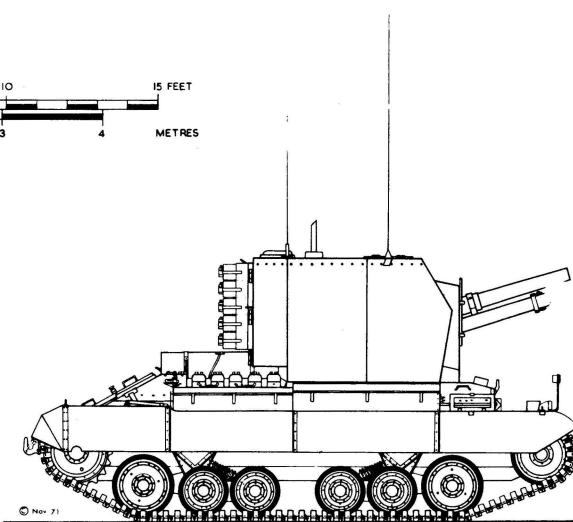
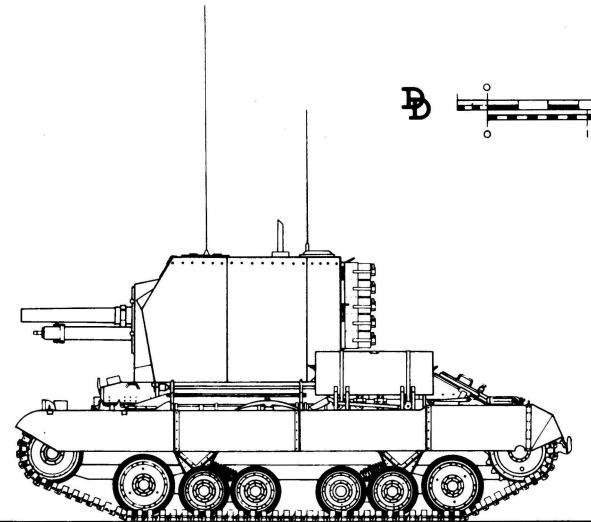
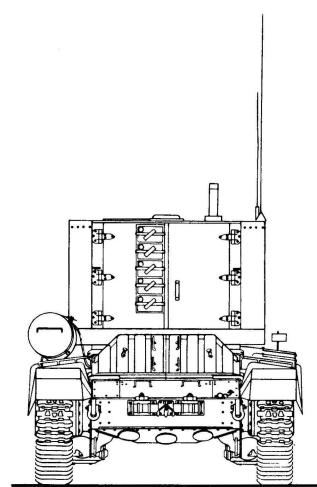
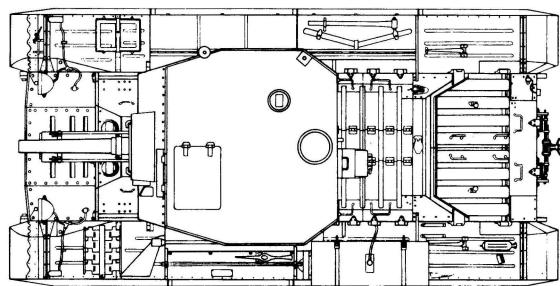
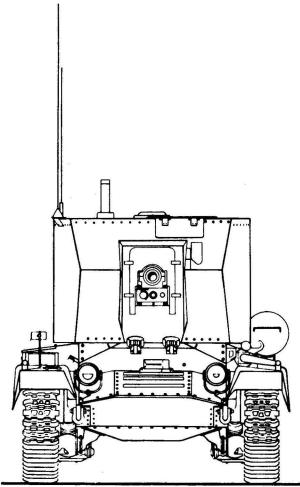
The British choice of carriage lay between the Cruiser Mk. VI "Crusader" and the Infantry Mk. III "Valentine". The Valentine chassis was considered the most reliable for the purpose, and in June 1941 the Birmingham Carriage and Wagon Company were given a priority request to plan for mounting the 25 pdr gun on this chassis. The project was pushed through very rapidly and a prototype was supplied for test firing at Shoeburyness in August 1941. The results of these tests were considered satisfactory, but from then on there were considerable delays in an order being given, and constant changes in instructions. This was due to the familiar division of responsibility. Some departments at the Ministry of Supply considering the new vehicle as a tank mounting a 25 pdr gun, and other departments considering it as an Artillery 25 pdr gun mounted on a tracked carriage.

Eventually, on 4th November, 1941, an order was placed for 100. Thereafter there was more indecision about the future programme. At first it was stated that a further 200 were required but this was later cancelled. At the beginning of July 1942, by which time the original order was practically complete, an additional 50 were ordered. As armour plate for this extension order had not been requested a break in production occurred, and it is thought that these further 50 were never produced.

BELOW: A Battery of Bishop self-propelled 25 pdr guns in action at Grenadier Hill in Tunisia in 1943. The unit is belong to the 1st Army and carries the shield of the 1st Army on the rear of the auxiliary fuel tank. Markings on the rear of the hull include the letter "F" on the left side and 201 on the right hand side. (IMPERIAL WAR MUSEUM PHOTOGRAPH – BNA 1449).

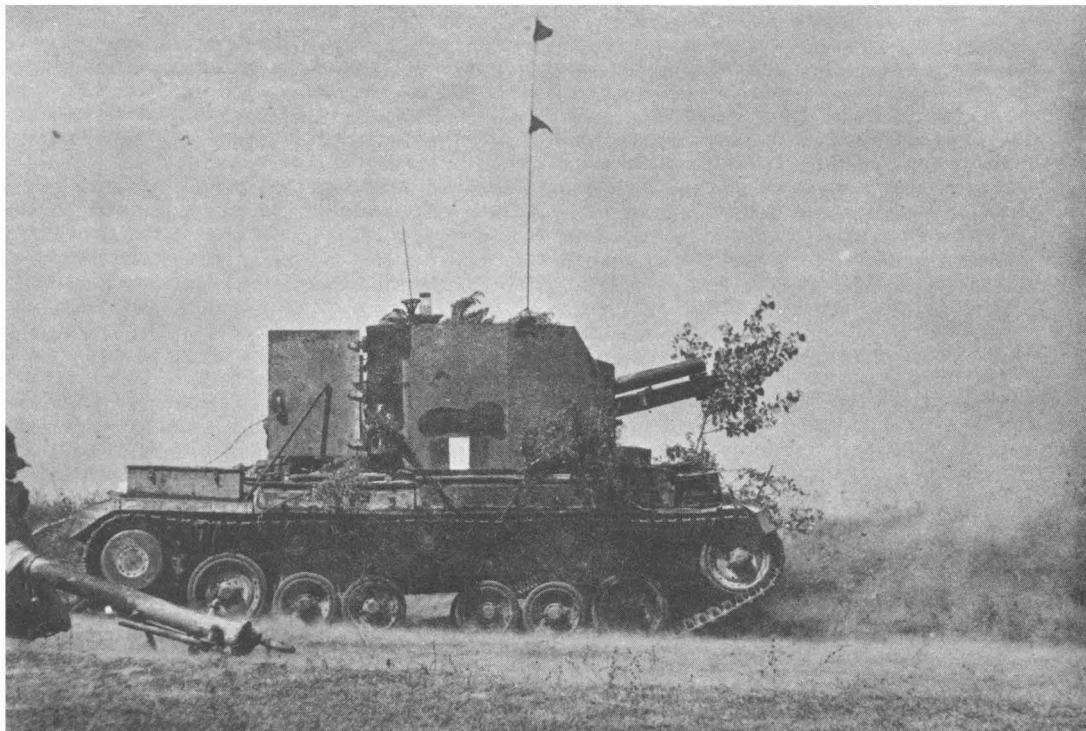






SELF PROPELLED 25 Pdr. 'BISHOP'

DRAWN BY D.P.DYER



ABOVE: This Bishop with its gun fully recoiled has just fired on German positions in the Naples area. Note the projectile ejector rod lying against the open superstructure door. In the foreground is a No. 27 Artillery trailer used to carry 32 additional rounds of ammunition. This vehicle belonged to a unit of the 5th Army. (IMPERIAL WAR MUSEUM PHOTOGRAPH – BNA 6866).

By the time they reached the battlefield in North Africa the necessity for 25 pdr guns to be used primarily as anti-tank guns had disappeared as by April 1942 the production of 6 pdr anti-tank guns had reached 1500 a month.

As a normal self-propelled field gun the Valentine mounting had four serious drawbacks. Firstly, whereas the 25 pdr on a field carriage had 45° of elevation, that on the Valentine was restricted to 15° thereby reducing the maximum range from 13,400 yards to 6,400 yards. In order to improve this range a ramp had to be built for the vehicle to drive up, thereby increasing the elevation of the gun relative to the ground.

Secondly, should a target be designated outside the traverse of 4° right or left of the centre line, also at a range of over 6,400 yards, the ramp would have to be extended to each side whereas the field mounting could cover 360° of arc on its turntable. Such a limited traverse would have been a serious disadvantage in fighting tanks passing across the front at close range. To assist gunlaying, the driver was supplied with vane limit sights in front of his two periscopes to enable him to position the vehicle so that the gun could at least point towards the target. If the target moved outside the limit vanes the driver turned the vehicle accordingly. As the driver's periscopes were relatively low a lot of superstructure had to be exposed for him to see the target. The height of the fighting compartment was the third serious drawback making a very obvious target. This height was due to the requirement for complete armour protection allowing for headroom for the commander and loader, sitting as they had to above the engine compartment. The final problem was the utilisation of the chassis of an Infantry Tank with its low maximum speed of 15 mph (24 kph). This speed fell far short of the speed that could be obtained under normal circumstances with the 25 pdr gun towed by a 'Quad' wheeled tractor. In order to move the guns on the Valentine chassis for large distances they had to be taken by Tank Transporters.

The Artillery did not like this design which inhibited the performance of their highly regarded 25 pdr, and although it was used by them across North Africa, in Sicily, and in Italy, it never distinguished itself. In any case, the U.S. 105 mm Howitzer Motor Carriage M7 started coming off the assembly lines in April 1942, as it was a much more useful artillery weapon; this pushed the Valentine mount even further into the background. Due to its pulpit like machine gun mount, the M7 was christened 'Priest' and in retrospect the Valentine mount in keeping with the ecclesiastical theme was called 'Bishop'.

From the mechanical aspect the hull and suspension of the Bishop was exactly the same as the Valentine II, which was powered by an A.E.C. Diesel engine. The turret mounting plate was removed and a box like superstructure which overhung the sides of the hull and the engine compartment fitted in lieu. The gun and cradle together with recoil cylinder, elevating and traversing gear, sights and saddle were all as used on the field carriage. A saddle supporting bracket was fabricated and bolted to the top of the driver's compartment being braced by diagonal struts. This contained a bushed vertical hole for the saddle pivot, both to support the piece and allow traverse. The gunner had a seat to the left and rearwards of the gun at the top of the hull side plate. The Commander sat to the right at the rear of the fighting compartment and the loader to the left, both seats being over the engine. A false floor was provided at the rear of the fighting compartment to facilitate servicing of the gun and for stowage. Backrests for the Commander and loader were fixed to the rear doors. In action it was necessary for these rear doors to be locked open to help disperse gun fumes. A roof ventilator was provided which appeared either at the front to the right or central at the rear. The 25 pdr gun used two piece ammunition, the charges being contained in brass cartridge cases. A total of 32 complete rounds consisting of eleven armour piercing and 21 high explosive shells were carried within the fighting compartment. At the rear of the vehicle a towing hook was provided for a standard No. 27 Artillery Trailer which contained a further 32 complete rounds. Five P.O.W. (Petrol or Water) two gallon cans were standard equipment and were attached to the outside of the left hand rear door. For use in the Middle East these were always used for water. To increase the range an additional 30 gallon drum of diesel fuel was carried in brackets over the left track guard to the rear of the fighting compartment. This could be jettisoned from inside the fighting compartment if the need arose.

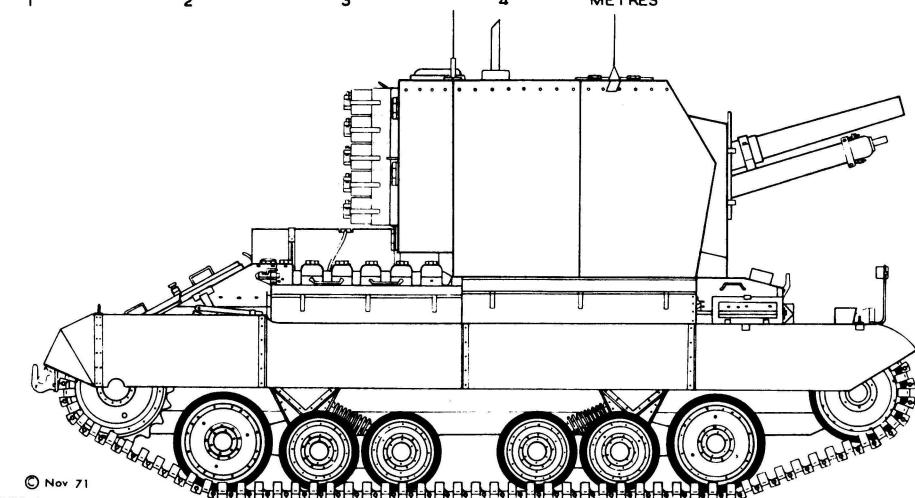
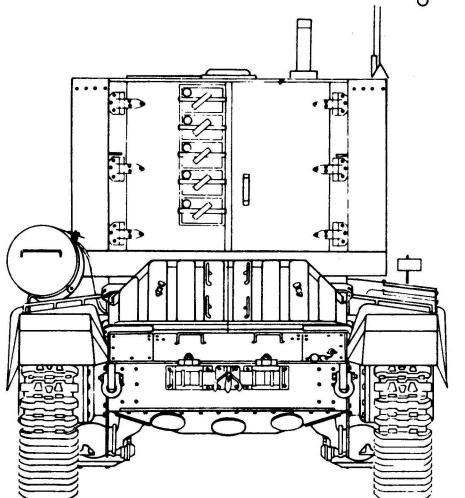
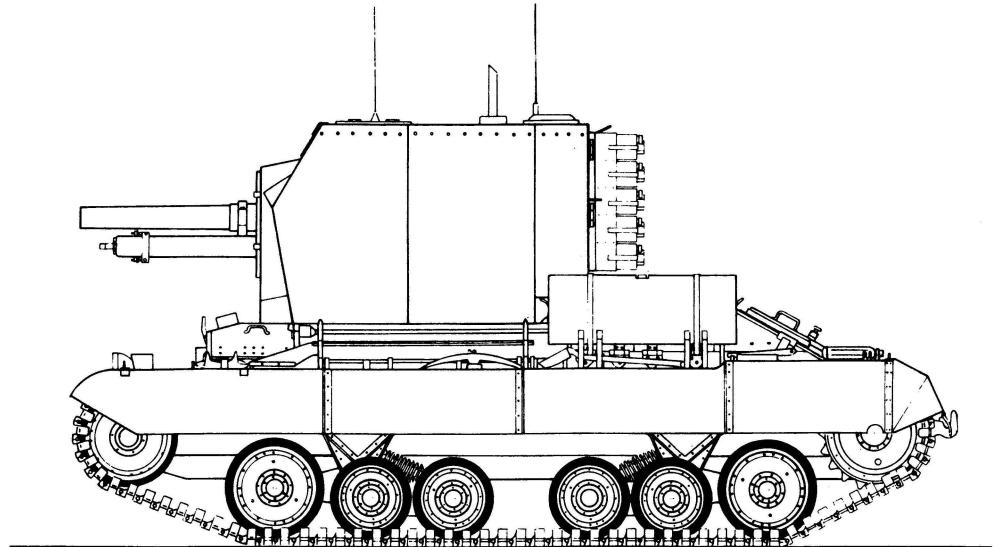
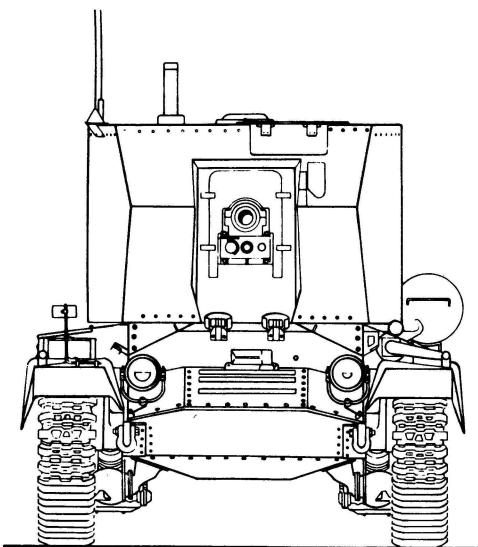
The gun mantlet itself was crude in the extreme consisting of a piece of flat plate armour with an aperture for the gun and recoil housing. This was supported by the recoil housing and held against the vertical front plate of the fighting compartment by four welded clips which allowed vertical and sideways movement. No bullet splash protection was provided for this, although some vehicles had field modifications carried out whereby an additional plate was welded on each side of the housing from which the gun protruded.

Not shown on the drawings for clarity, a camouflage net was stowed on the right rear mudguard and a waterproof cover on the left rear mudguard. The towrope was stowed connected to the left rear towing lug and along the left side of the vehicle above the silencer cover, the front end being strapped down in front of the spare track links.

BELOW: Front view of a Bishop belonging to the 1st Army in Tunisia in March 1943. Note the additional armour welded on the sides of the gun mantlet. This was a field modification made in an attempt to improve splash protection. The reel of telephone cable was used to interconnect different guns of a Battery for coordinated bombardment. (IMPERIAL WAR MUSEUM PHOTOGRAPH – BNA 1027).

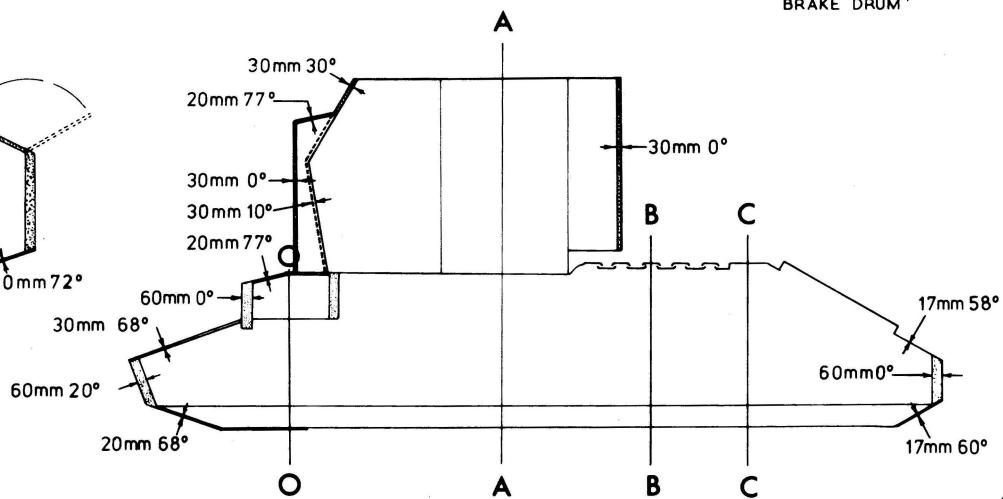
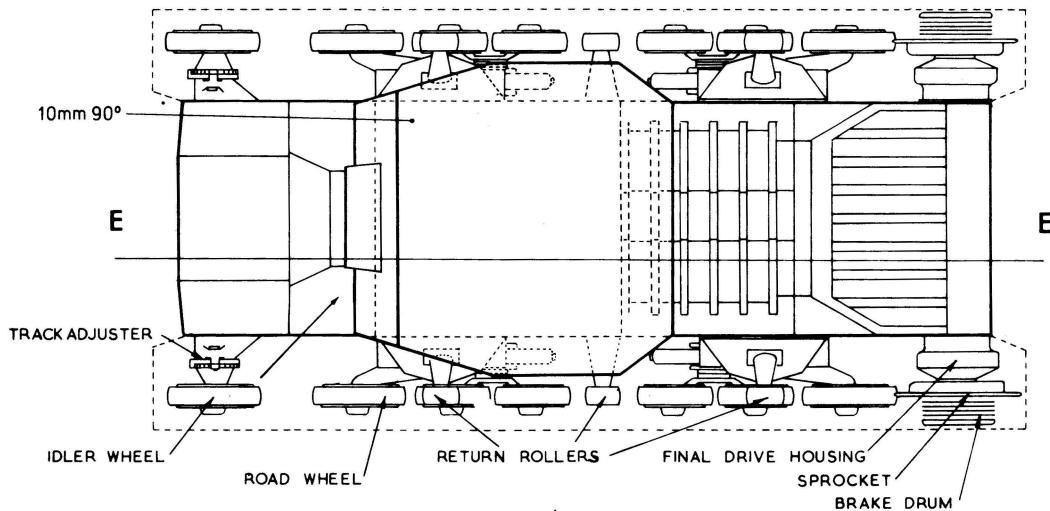
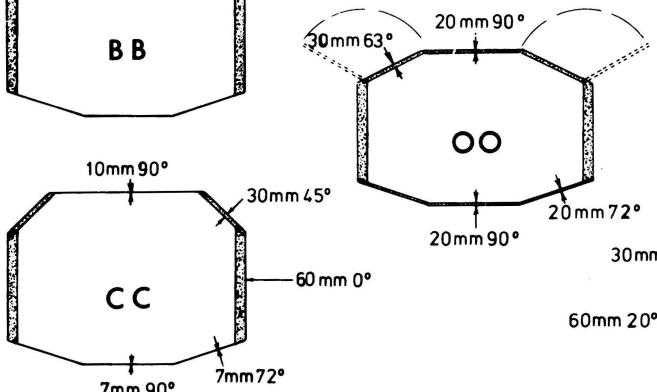
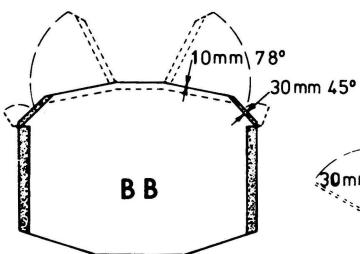
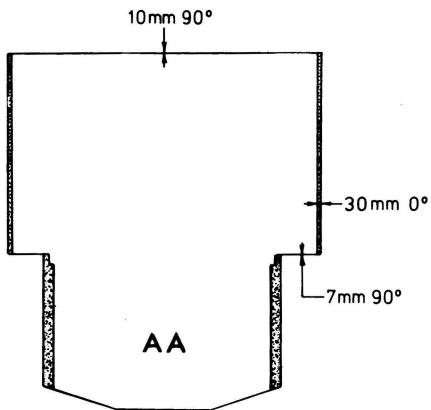


The author wishes to acknowledge the Royal School of Artillery for permission to use the photograph of No. 27 Artillery Trailer and thank the R.A.C. Tank Museum for permission to reproduce interior stowage diagrams.



25pdr BISHOP

ARMOUR PROTECTION

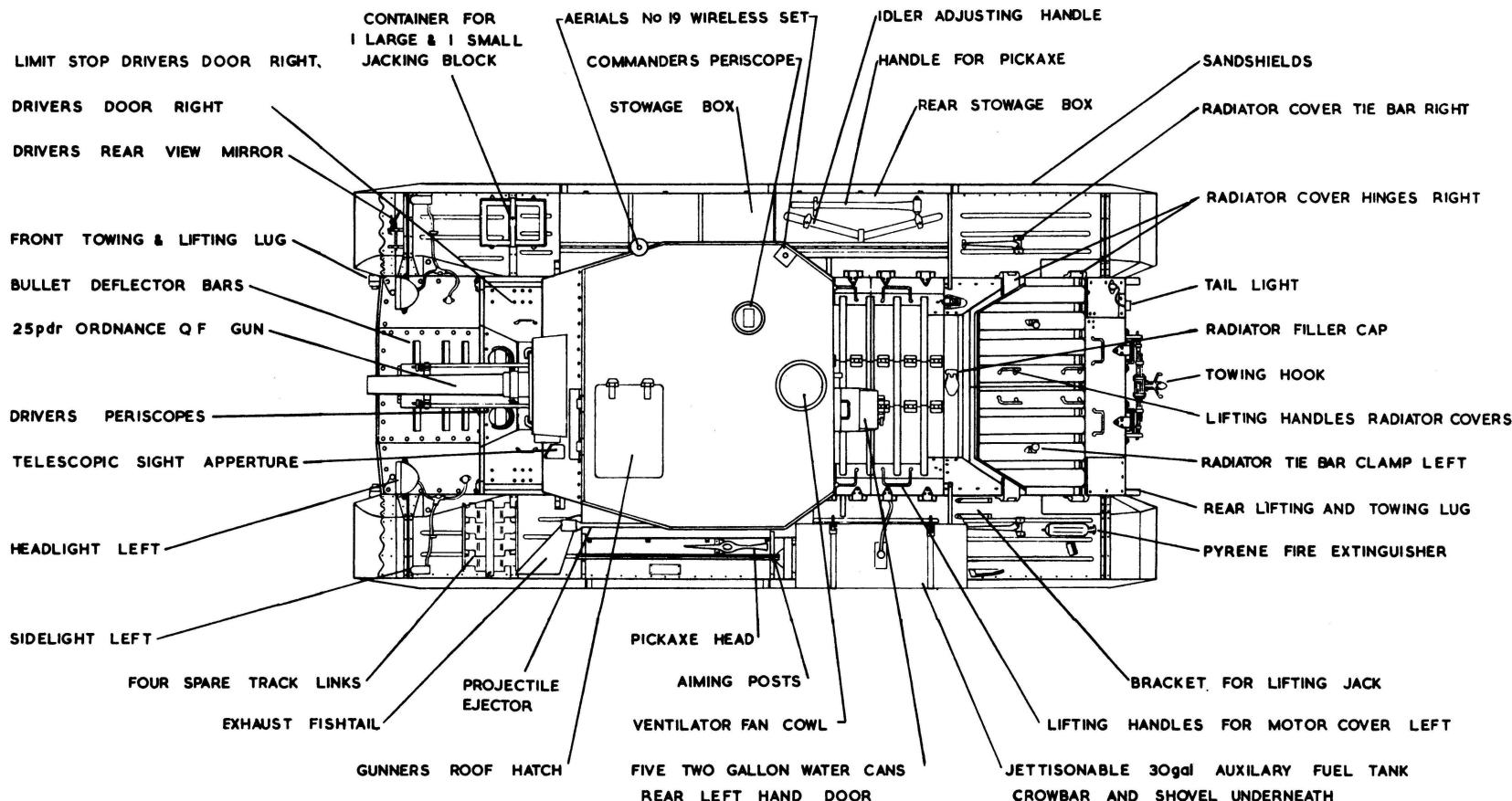


Section EE

SELF PROPELLED 25 Pdr. 'BISHOP'

10

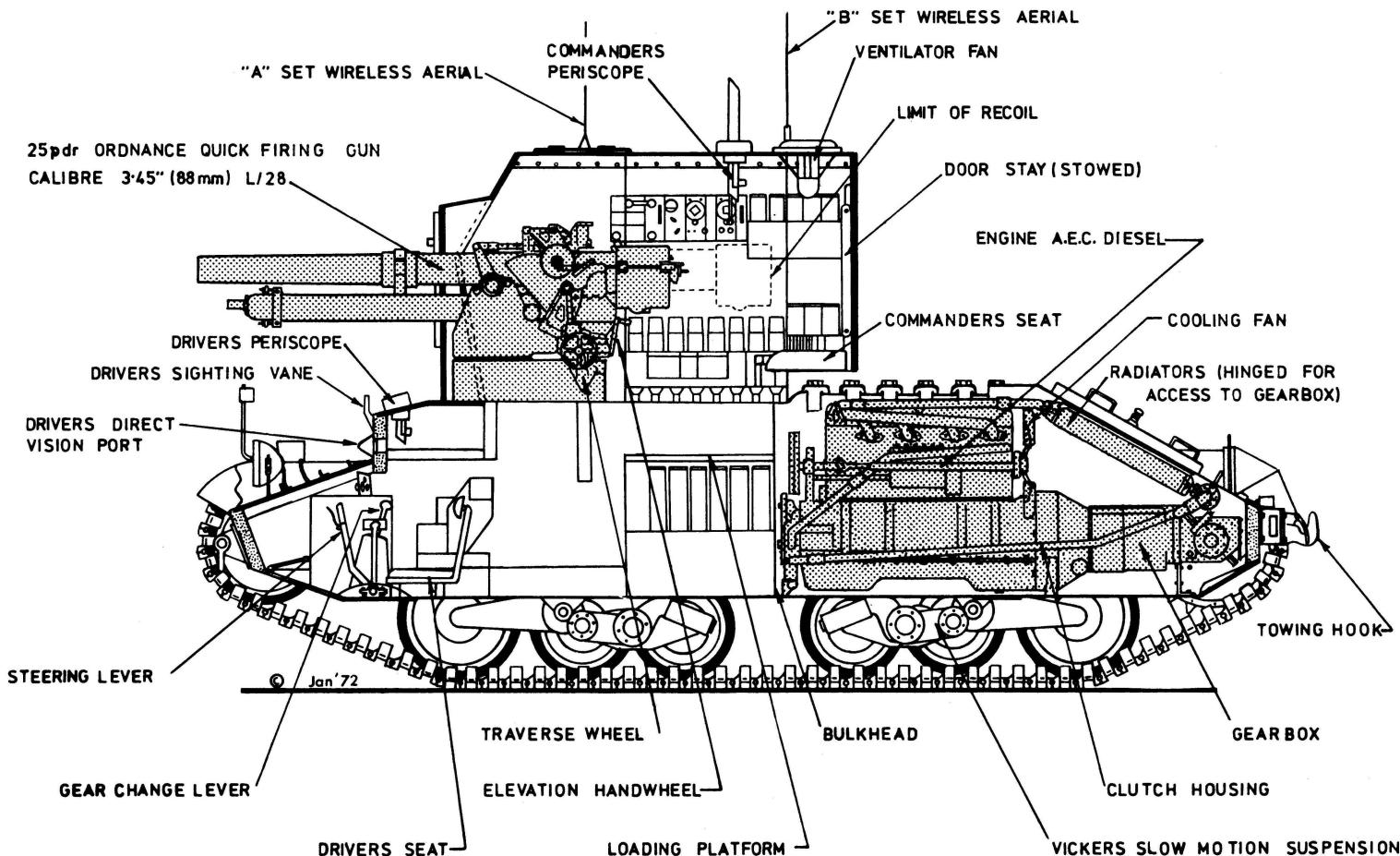
DRAWN BY D.P.DYER

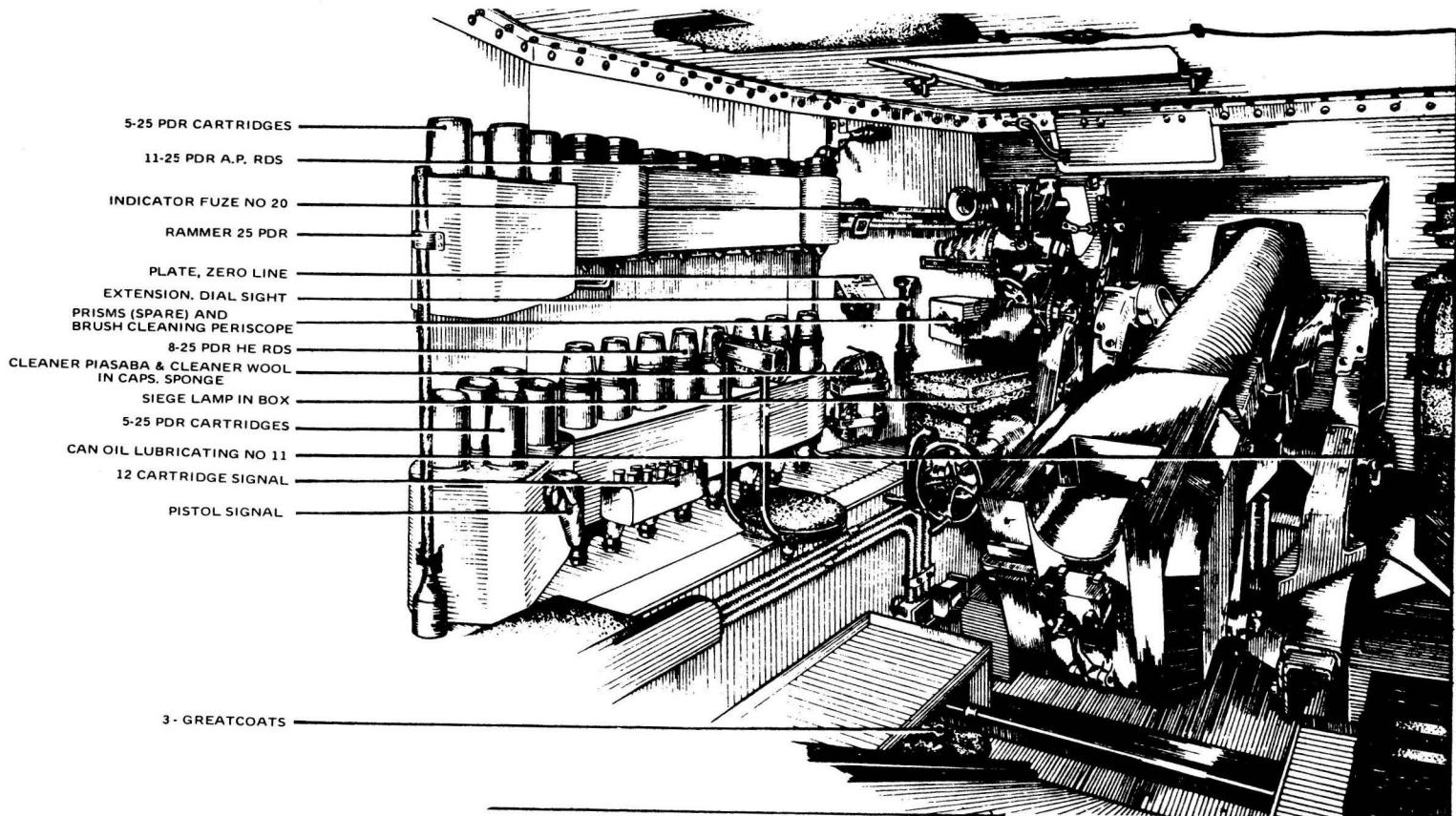


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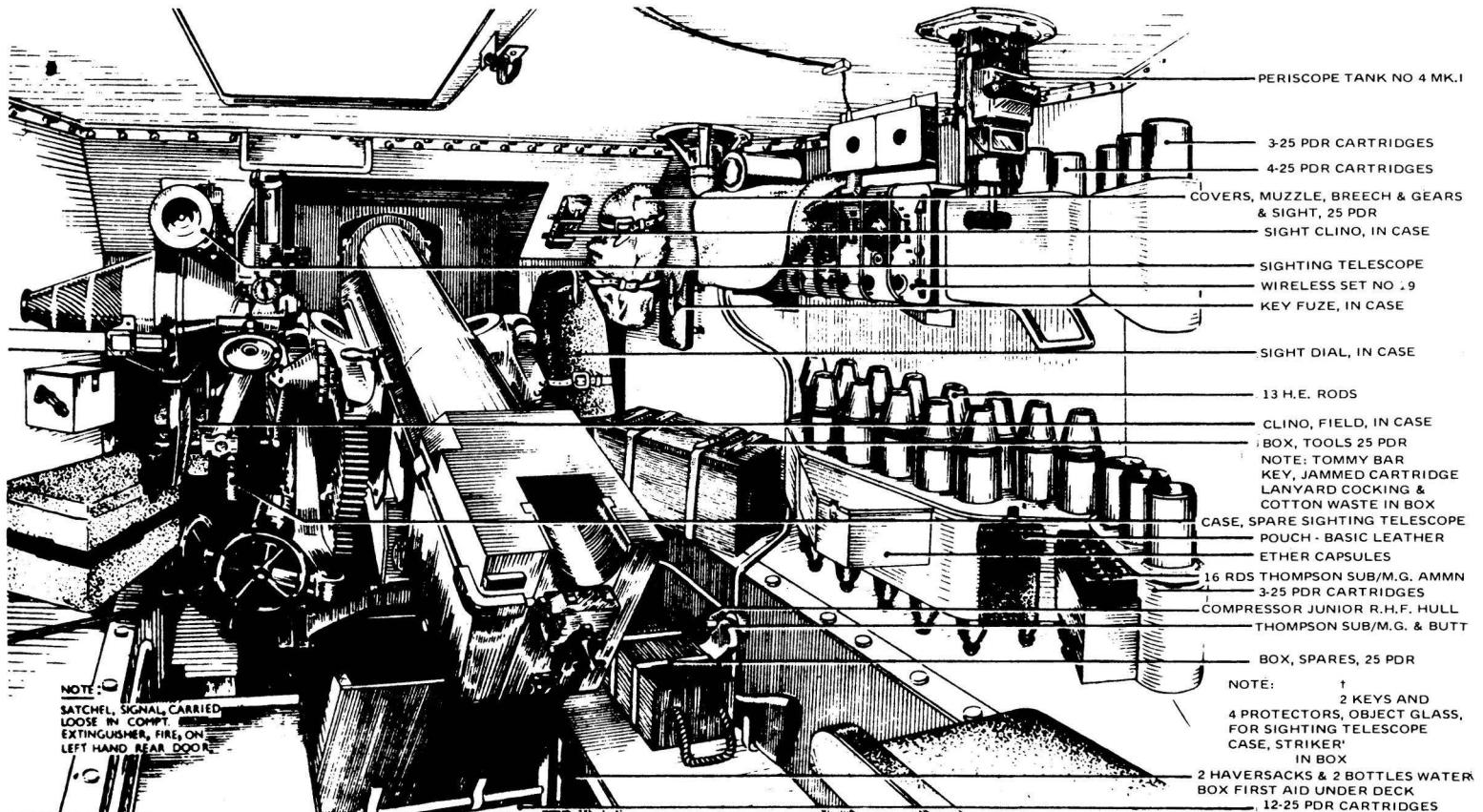
25pdr BISHOP

SECTION





VALENTINE 25PDR.
STOWAGE SKETCH - INTERIOR TURRET & HULL.N.S.

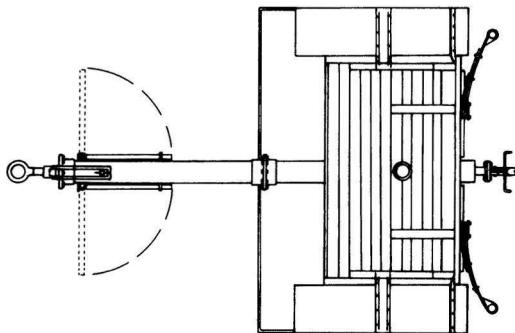


VALENTINE 25 PDR.
STOWAGE SKETCH - INTERIOR TURRET & HULL.O.S.

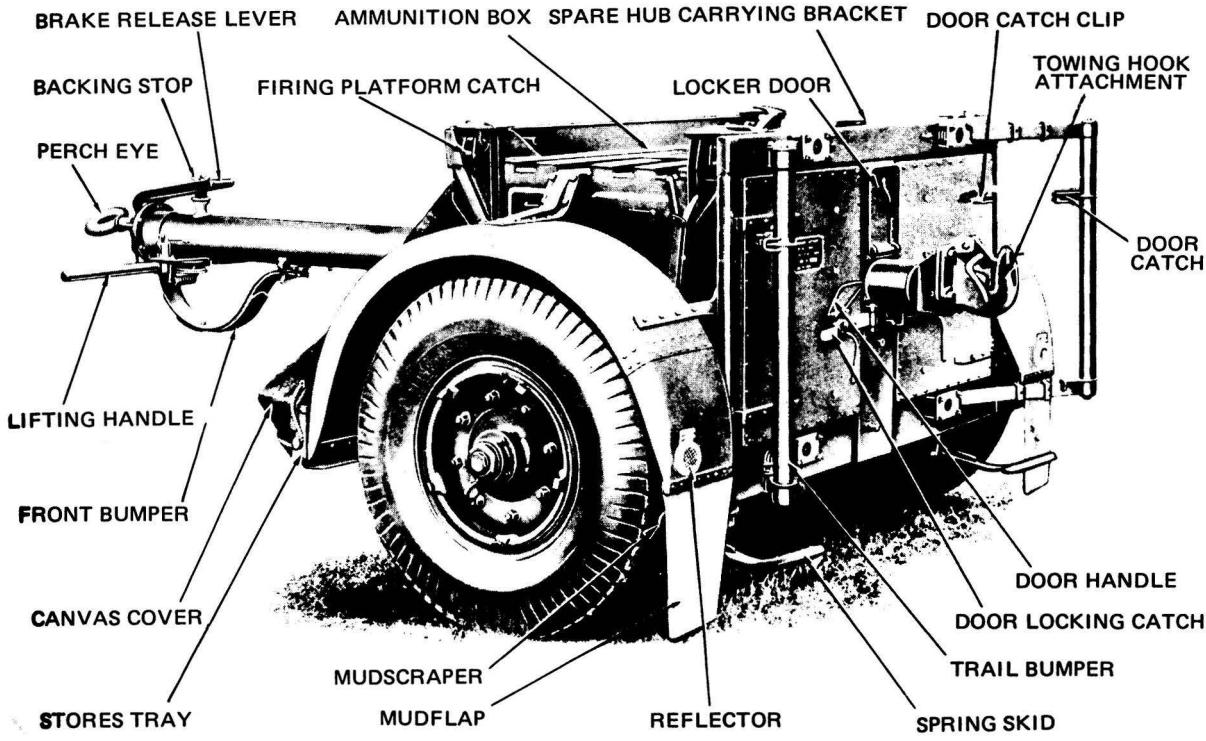
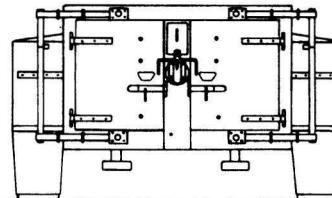
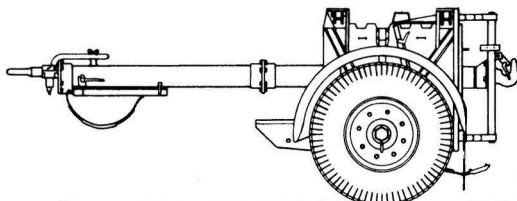
**TECHNICAL SPECIFICATION FOR CARRIER
VALENTINE 25 pdr GUN Mk. I BISHOP**

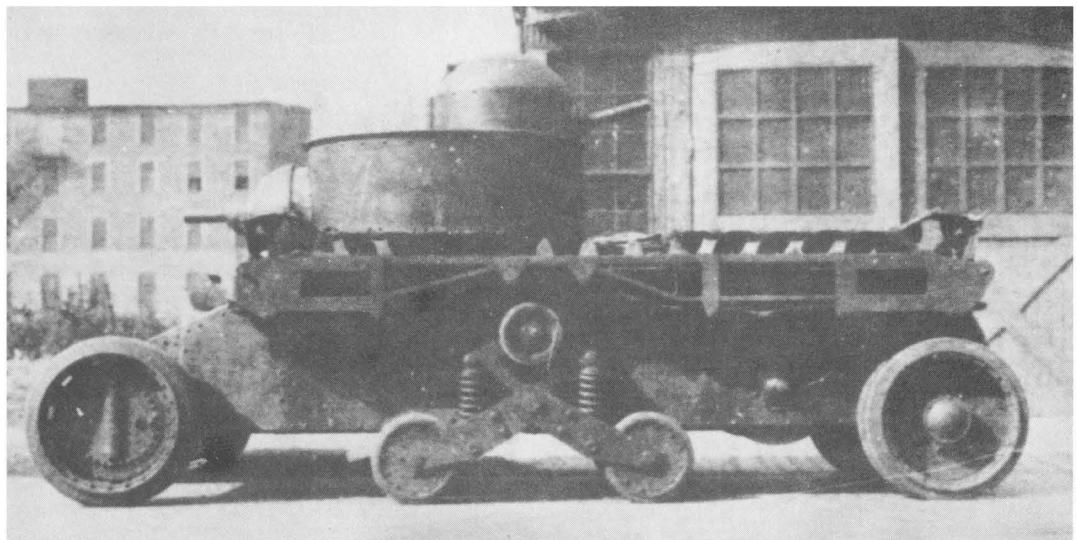
Crew	4 – Commander, driver, gunner & loader	Armament	
Weight laden without crew	38,452 lbs. 17.1 Long tons 19 short tons 17.44 Tonnes	Main Calibre and length in calibres	Ordnance Q.F. 25 pdr Gun 88 mm (3.45 ins) L/28
Performance		Traverse	4° left 4° right
Speed, max. road	15 mph (24 kph)	Operation	Handwheel
Max. gradient	32 degrees (64%)	Elevation	plus 15 degrees, minus 5 degrees
Fording depth	3'-0" (91 cm)	Operation	Handwheel
Trench crossing	7'-9" (236 cm)		
Step	3'-0" (91 cm)		
Ground Pressure Zero Penetration	22 lbs/sq. in. (1.55 kg/sq. cm)	Secondary Armament	
Range, Road	110 Miles (177 km) + 90 miles aux. tank (145 km)	1 x Thompson Sub Machine Gun – 45"	
Cross country	65 miles (105 km) + 55 miles aux. tank (89 km)		
Power to weight ratio (Gross)	7.7 HP/ton	Stowage	
Dimensions		Ammunition, main armament	32 rds
Length overall incl. towing hook	18'-6" (563 cm)	Ammunition, secondary armament	320 rds. – .45" in 16 x 20 round magazines
Width with sandshield	9'-1" (276 cm)	Internal fuel capacity	36 Imp. gals. 43 U.S. gals. 164 litres
Height to top of commanders periscope	10'-0" (305 cm)		
Ground clearance	1'-5" (43 cm)	Armour	
Fire height of gun	6'-10" (208 cm)	Type	Rolled plate welded, riveted and bolted construction
Road wheel dia (overall)	2'-0" (61 cm) & 1'-8" (51 cm)		
		Communication	
		1 x No. 19 Wireless Set	
Trackwork		Vision	
Centres	7'-3" (221 cm)		
Length on ground	10'-2" (310 cm)	Two Vickers tank periscopes for driver plus direct vision port with triplex block. One Vickers tank periscope – Commander.	
Width	1'-2" (36 cm)		
Pitch	4.36" (11 cm)		
Number of links per track	103		
Type	Single Dry Pin		
Mechanical Details			
Engine	A.E.C. A.190 six cylinder in line diesel water cooled 9.64 litres bore 4.724" (120 mm) Stroke 5.59" (142 mm) 131 B.H.P. at 1800 RPM Four Stoke Single Plate Clutch		
Transmission	Meadows Type 22 Sliding Pinion 5F1R		
Steering	Clutch/Brake		
Suspension	Two Vickers 'Slow Motion' Suspension Bogies each side Three Return Rollers		

No. 27 ARTILLERY TRAILER



0 1 2 3 4 5 6 7 FEET





ABOVE: Side view of the Christie Tank Model 1919. This photograph shows the bogie raised to allow the tank run on wheels only. The track is stowed on the mudguards. Though it included many interesting features this tank was most unsuccessful. (OFFICIAL U.S. PHOTOGRAPH).

CHRISTIE TANK MODEL 1919

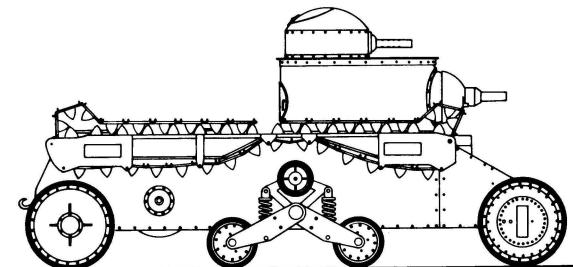
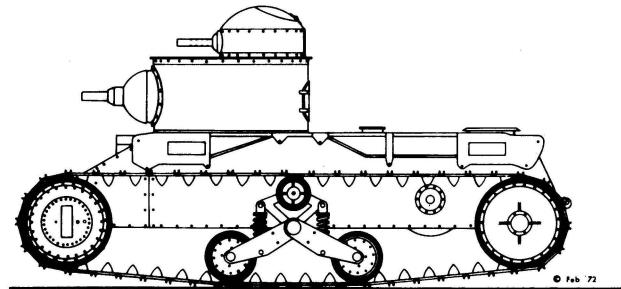
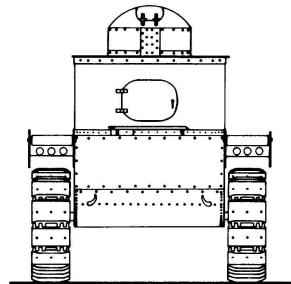
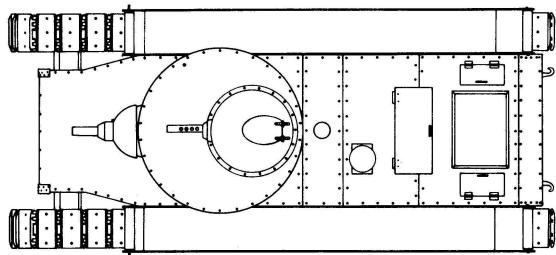
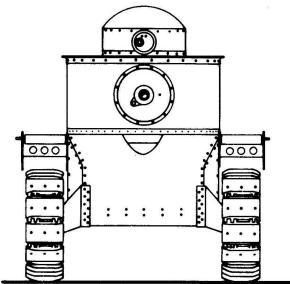
Drawings and Historical Research by D. P. Dyer.

The FRONT DRIVE MOTOR COMPANY of Hoboken, New Jersey was formed by J. Walter Christie in 1904 in order to exploit the front wheel drive he had developed for Motor Cars. Nine vehicles were built over the next six years none of which became a commercial proposition. He therefore turned his attention to the production of conversion traction units to motorise horse drawn fire engines, and so give these expensive pieces of equipment a further lease of life. Business was dwindling by 1915 and in order to participate in the growing War production, he accepted a contract to design and build a self-propelled gun carriage for the proposed 3" anti-aircraft gun, which was under development. One pilot was built in 1916 followed by four production vehicles in 1917. Whilst these vehicles had four wheel drive, due to their weight and to only having 'solid' tyres their cross country performance was very poor, amongst other faults.

To improve cross country capabilities of the next gun mounting which was for the 8" howitzer, he introduced the convertible feature that was to figure so prominently in all of his later designs of fighting vehicles. For the purpose, he utilised large diameter road wheels with twin rubber tyred flanges, giving the effect of two parallel wheels with a gap in between. For cross country work a track made up of flat steel plates hinged together was fitted around these wheels. Centre guides on the rear face of these links passed between the twin tyres of each wheel. These guides also engaged into slots between the tyres of the driving wheels in order to transmit motive power to the tracks, in the manner of a reversed sprocket. It must be remembered that up to this time all other designs of tracked vehicles used chain link type tracks with flat plates attached, and small diameter steel rimmed road wheels. Whilst only two of the five road wheels each side of the 8" gun carriage had any springing, for its time it was quite remarkable with a top speed of 16 mph and a very creditable cross country performance. The success of the 8" Howitzer Carriage led to further contracts for self-propelled gun carriages, but at the same time started Christie thinking about tanks.

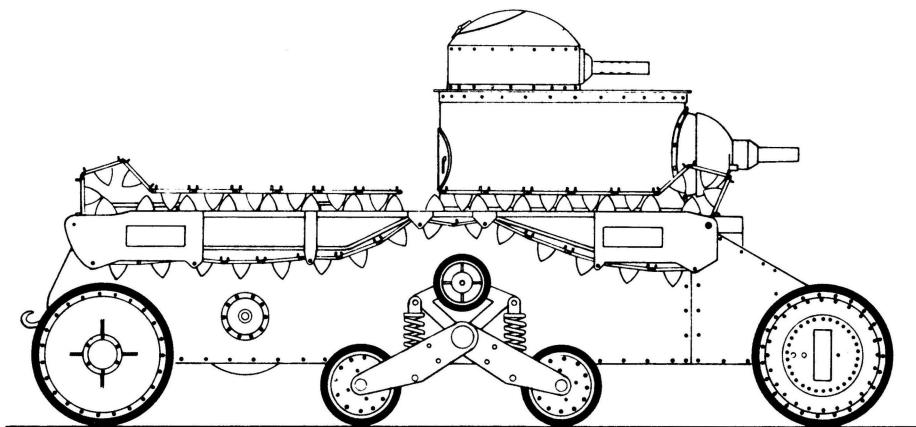
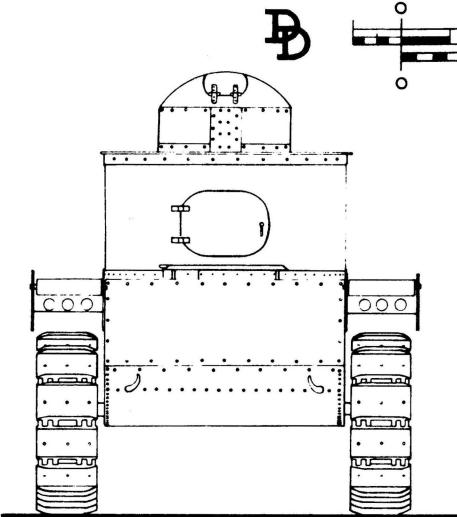
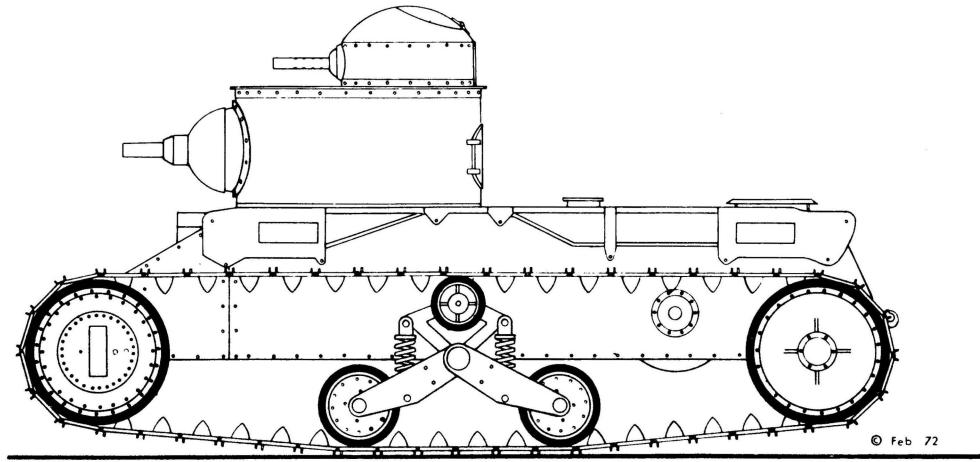
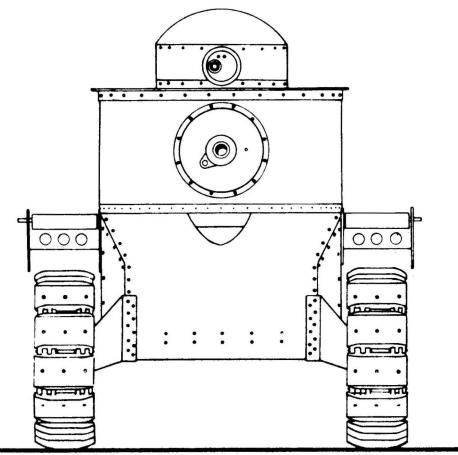
In the Autumn of 1919 he demonstrated the 8" gun carriage to the Tank Corps at Camp Meade to illustrate his proposal for a tank chassis. Colonel Rockenbach then the Chief of the Tank Corps was most enthusiastic over the idea, and in a communication to the Ordnance Committee stated that the preliminary study made by Mr. Christie was satisfactory, and urged that he be allowed to go ahead with all the energy possible to produce a tank. An order was therefore placed with the Front Drive Motor Co. on 22nd November, 1919, for the study, design and manufacture of one Christie Tank.

The correct procedure should have been for the Tank Corps to supply a general specification of what it required to the Ordnance Corps who would work out the mechanical details to produce the required result. Due to Christie getting in by the back door, as it were, a different set of circumstances prevailed. It was felt by the Ordnance Committee however, that as the Tank Corps thought they would be getting the machine they desired, it was to be



CHRISTIE TANK 1919 MODEL

Drawn by D.P.DYER



CHRISTIE TANK 1919 MODEL

pushed to completion, unless there were clear violations of mechanical principles. In view of the incorrect procedure adopted the complete specification for this tank wasn't drawn up until 8th June, 1920, six months after the order had been placed.

A demonstration of the almost completed tank was given at the manufacturer's plant in January 1921. Mr. Christie requested authority to make certain changes, the finished machine being delivered to Aberdeen Proving Ground on 5th February, 1921, being demonstrated in Washington on February 8th and 9th.

Until 21st April, 1921, when Mr. Christie asked for the tests to be suspended, the vehicle had logged 374 miles on test, of which only 37 miles were on tracks. In order that various modifications could be made to his design a contract was agreed upon on 15th June, 1921. These modifications resulted in a complete rebuild of the vehicle greatly altering its appearance. Although official documents and records at the time referred to the rebuild still just as the Christie Tank, for the sake of clarity in later years, the original model is referred to as the model 1919, and the rebuild as the model 1921. The rebuild will be the subject of a later Bellona print.

Whereas one would have thought that the Tank would have been an improvement on the gun carriage, this was not the case. The tank was 10,000 lbs lighter, had the same engine, similar transmission and tracks, yet the top speed was 3 mph less. Whilst it is inferred that the cross country ability was poor there were so many other faults that this is overshadowed.

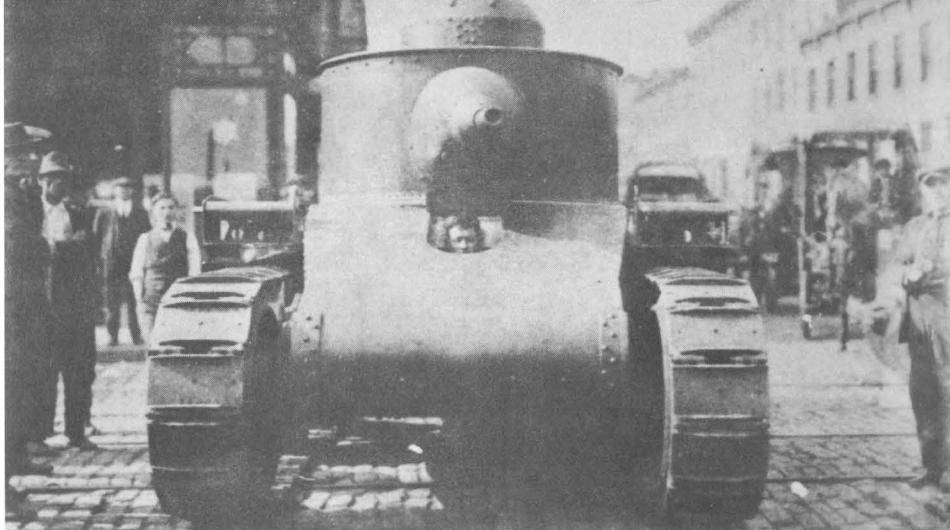
The retrograde step as far as the suspension was concerned was that on the gun carriage, which had a shorter wheel-base, there were five large diameter wheels, on the tank only two large diameter and two small diameter wheels distributed the weight on the ground track run. The small wheels were mounted on swinging arms on a common pivot controlled by coil springs, with the single return roller mounted as part of the assembly. This bogie assembly could be raised or lowered from inside the tank. The idea being that for road running without tracks the bogies were raised, thereby transferring the majority of the weight of the vehicle to the steering and driving wheels as on a normal four wheel vehicle. When tracks were fitted the bogies were lowered so that they supported the weight of the vehicle. This was partly to give a 'softer' ride over rough ground but also to increase the angle of approach and departure of the tracks for crossing obstacles. Whilst the drawings show the vehicle with tracks supported entirely on the central bogies it is thought that the centre of gravity may have been to the rear of the bogie assembly, thereby bringing all of the rear lower run of the track into contact with the ground.

The fitting of tracks was time consuming and under ideal conditions on a concrete floor took 55 minutes which did not include removing the tracks from their stowage positions and laying out in straight lines. No time is quoted for removing tracks although this is presumably less. To assist with lifting the portions of tracks onto the track stowage platforms, rollers fitted with ratchets and square drive shafts projecting from their axis were located at the front ends of these platforms. A thin cable was affixed to this front roller, led over the rear roller and connected to the end of the disconnected track. By means of a suitable handle to rotate the front roller the track could then be winched over the rear roller and onto the platform. The top run of track, after being disconnected above the drive wheel and steering wheel was suspended from underneath the track stowage platform.

The model 1919 incorporated certain original ideas, not including those already mentioned introduced on the 8" gun carriage, but the whole concept was badly engineered from the point of view of design, standard of workmanship, and quality of material. Amongst the original ideas must be included the bogies as being the forerunner of variable suspensions. These bogies could also be considered as being the first step in the development of vertical volute suspension. The large fully rotating turret with a rotating cupola, and a co-axial machine gun fitted alongside a decent size gun were also innovations at the time, although the gun mounting was more than likely an Ordnance Department product as it also appeared on the Medium A, and the rotating cupola could very well have been included as part of the specification.

As the tank was originally built Christie showed his, what was to become usual, disregard of complying with his customers' requirements. A list of 32 important items differed from the specification. Faults with the tank itself consisted of lack of power, difficulty in steering, excessive vibration, lack of reliability, lack of ventilation, lack of accessibility and lack of rigidity. Tyres wore out rapidly, tracks were thrown frequently and the engine overheated constantly. The only means of entry for the crew was through the turret door. There was, however, an emergency exit hatch in the floor of the fighting compartment.

At this period a number of these faults were common to all designs of first generation tanks, and a pilot model was even more prone to suffer with them, however, the aim of the Ordnance Department was to ensure that the vehicle was mechanically sound which it obviously was not. For the original building of the Model 1919 Christie was paid the sum of \$67,000.



ABOVE: Front view of the Christie tank Model 1919 running on tracks. (OFFICIAL U.S. PHOTOGRAPH)

**TECHNICAL SPECIFICATION FOR
CHRISTIE TANK 1919 MODEL**

Performance	3	Type	Hinged flat plates with narrow grousers alongside hinges. Centre guides
Weight	24,000 lbs 10.3 Long Tons 12 Short Tons 10.1 Tonnes	Mechanical Details	
Speed – Bottom Gear	1.4 mph (2.3 Kmph)	Engine	Christie Six Cylinder In Line Four Stroke Petrol forced water cooling 120 b.h.p.
Speed – Second Gear	3 mph (5 Kmph)	Transmission	Sliding Gear Four speeds forward and four speeds reverse
Speed – Third Gear	7.5 mph (12 Kmph)	Steering	Clutch and brake on tracks.
Speed – Top Gear	13 mph (21 Kmph)		Front wheels steerable on wheels via a steering wheel.
Range	35 miles on tracks (56 km) 75 miles on wheels (121 km)	Armament	
Power to Weight Ratio	12.6 hp per ton British 10.8 hp per ton U.S.	Main	6 pdr Q.F. 57 mm (2.24") M1920 L/23 1,350 fps muzzle velocity
Ground Pressure Zero Penetration	8.9 lbs/sq. in. (.626 kg/sq. cm.)	Traverse	Calibre length is according to U.S. practise based on bore length only
Dimensions		Secondary Armament	360° in turret hand operated, plus fine laying traverse of gimbal mount
Length with tracks	18'-2" (553 cm)		1 x .30 cal browning m.g. co-axial
Width over track platform	8'-0" (243 cm)		1 x .30 cal browning m.g. in ball mount upper turret
Height on tracks	9'-3" (281 cm)	Stowage	
Height on wheels	8'-6" (259 cm)	Internal Fuel capacity	49 Imp. gals. 59 U.S. gals. 223 litres
Ground Clearance from bottom of hull on wheels	1'-3" (38 cm)	Armour	
Fire Height of Gun on wheels	5'-7" (170 cm)	Type	Rolled Plate except for gun mantlet which was cast.
Turret Ring Diameter (Est)	4'-8" (142 cm)		Riveted and bolted construction on mild steel angles and brackets.
Road Wheel Dia.	36" (91 cm) and 20" (51 cm)	Thickness	9/16" (6 mm) location not quoted
Trackwork			3/8" (9 mm) location not quoted
Centres	6'-6" (198 cm)		1/2" (13 mm) location not quoted
Length on ground	14'-11" (454 cm)		
Width	1'-3" (38 cm)		
Pitch	9 1/4" (25 cm)		
Number of links	47		

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